AFIT/GCM/LAS/99S-5

BEFORE AND AFTER: IS OUTSOURCING A BETTER VALUE THAN ORGANIC SUPPORT? A CASE STUDY COMPARING ORGANIC VS. CONTRACTOR CONTROLLED DEPOT-LEVEL MAINTENANCE OF THE F-117

THESIS

HARRY T. LOUGHRAN
1Lt, USAF

JOHN S. WEBB

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THESIS

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HARRY T. LOUGHRAN
1Lt, USAF

JOHN S. WEBB

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Harry T. Loughran

John S. Webb

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Abstract

The Cold War may be over but the force modernization war has just begun. If the Air Force is going to meet its goals established in Joint Vision 2001, ways must be found to modernize aging weapon systems in the face of decreasing defense budgets and personnel resources. In a hurried effort to realize the savings necessary to continue with modernization, Air Force leaders have embraced the philosophy of outsourcing. Proponents claimed that outsourcing would reap vast savings, but recent General Accounting Office (GAO) audits confirm that the savings from outsourcing have not been as high as originally projected. These recent GAO reports suggest that problems with the way that cost estimating is done for outsourcing competition studies may overstate the economic advantages of this alternative to organic support (GAO Report, GAO/NSIAD-97-86, 1997).

The question Air Force leaders want to know is; can we determine whether or not outsourcing is a better value than maintaining a capability in-house? A unique situation has arisen at the Sacramento Air Logistics Center (ALC) where control of depot-level maintenance for the F-117 was transferred from government to contractor control. Now that control of the depot-level maintenance of the F-117 has been outsourced, we wanted to find out if outsourcing was a better value than the previous government controlled support. This study used archival cost data and mission capability factors, top level management interviews, and a customer satisfaction questionnaire to examine the relative value of outsourcing depot support of the F-117. Triangulating these three value elements helped us determine if outsourcing cost less, improved readiness, and increased

customer satisfaction when compared to government controlled depot-level maintenance. Our analysis found that depot maintenance of the F-117 since transferred to contractor control is a better value to the Air Force. Technical performance has been equal or better and savings of approximately $25 million is projected for the first year.

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I. Introduction

Background

With the end of the Cold War, the role of the Department of Defense (DoD) has radically changed. Since we are no longer challenged by another superpower and the main threat to the United States comes in the form of regional conflicts, the role and mission of the American military are less clear. As a result, support for large defense budgets has waned. Since the mid-1980s there has been an almost continuous reduction in defense spending. We have witnessed the withdrawal of troops from overseas, reductions in civilian and military personnel, base closures, and reductions of major weapon system acquisitions.

In 1993, Vice President Gore announced the National Performance Review (NPR) along with his plan for the reinvention of Government. With NPR, came an increased emphasis on improving fundamental internal processes. In its most basic form, NPR builds on four key principles: (1) cutting red tape; (2) putting customers first; (3) empowering employees to get results; and (4) cutting back to basics: producing better government for less. One strategy being explored to achieve NPR's efficiency goals is to encourage federal organizations to explore the viability of having private companies

perform all non-inherently governmental work. As the largest spender of discretionary funds, the DoD is one federal agency that can't afford to do things in its usual way, especially when private firms may be able to perform DoD's non-core functions better, cheaper, and faster. "Functions such as command, deployment, or rotation of troops cannot be contracted, of course. But data processing, billing, payroll, and the like certainly can" (Gore, 1993: 58). The following quote summarizes the overall philosophy of the NPR:

> We can no longer afford to pay more – and get less from – our government. The answer for every problem cannot always be another program or more money. It is time to radically change the way the government operates – to shift from top-down bureaucracy to entrepreneurial government that empowers citizens and communities to change the country from the bottom up. We must reward the people and ideas that work and get rid of those that don't. (Gore, 1993: 58)

A dwindling Air Force budget, increased operations tempo, and continuing manpower reductions have presented Air Force leaders with retention problems and the challenge of doing more with only 62 percent of the budget and 65 percent of the manpower of ten years ago. In 1989 the Air Force manpower level was 570,880 with a budget of $121 billion. In 1998 manpower was reduced to 371,577 and available funding dropped to $76 billion ("The Air Force in Facts and Figures", Air Force Magazine, Vol. 48, 1998: 36 & 46). Air Force leaders began eliminating unnecessary infrastructure (closing bases), and recouping the associated infrastructure costs. Opponents of these closures created a debate in Congress that resulted in reduced effectiveness of the Air Force's primary means of saving money. Political lines were drawn, and Congressmen fought to see who would control what some would call "government job welfare" (Kitfield, 1998: 28-31). The battles and long standing debate resulted because the

management plan to quickly close McClellan Air Force Base was not implemented decisively. This resulted in a compromise to privatize in-place the work of the Sacramento ALC (Kitfield, 1998: 28-31).

In spite of these difficulties, the Air Force has stepped up its pursuit of outsourcing any function that is not an inherently governmental function: "Additional outsourcing studies involving more than 100,000 positions will be started over the next six years" (GAO Report, GAO/NSIAD-97-86, 2-7, 1997). The primary areas considered for outsourcing were base support functions and depot-level maintenance. Initially, proponents claimed that outsourcing could save the Department of Defense billions of dollars. However, several recent General Accounting Office (GAO) reports regarding cost estimating practices and other commercial sector warning flags have caused us to re-evaluate the projected savings generated from outsourcing. This is a key factor in Future Years Defense Budgets because current Air Force weapons programs have used these projected savings in their program budget estimates (Peters, 1999: 21). The question now is: *Is outsourcing a better value than organic support*? This question demonstrates the need to do more research on the costs and benefits of outsourcing before proceeding further.

In her thesis entitled "Outsourcing: An Historical Review For The Projection Of Future Savings," Captain Leslee J. Saleck reviews both historical and current trends in outsourcing along with the conditions that contribute to a successful outsourcing relationship with the contractor. She warns that, "The DoD should be cautious about wholeheartedly embracing the Commission on Roles and Missions (CORM) and Defense Science Boards (DSB) recommendations to outsource essentially every non-war-fighting

activity. Though there is potential for savings through outsourcing, it is highly dependent on the existence of multiple conditions (Saleck, 1998: 74)." The conditions that represent the most feasible environment for outsourcing are: (1) the work to be done is clearly specified; (2) several potential producers are available, and a competitive climate either exists or can be created and sustained; (3) the government is able to monitor the contractor's performance; and (4) appropriate terms are included in the contract document and enforced (Savas, 1987: 109). This research examines the differences in cost and performance of government controlled depot level maintenance and contractor controlled depot level maintenance, and suggests a method of measuring the value gained or lost from outsourcing.

Problem Statement

The primary goal of this research was to examine, through triangulation of archival cost and performance data, expert interviews, and a customer satisfaction questionnaire, whether or not the Air Force was receiving a better value by outsourcing total responsibility for the depot-level maintenance of the F-117. Part of this primary goal is to design a questionnaire that measures the customer's perception of the value received from outsourced depot-level maintenance of the F-117. Throughout this research the value determination measured is the comparison of government controlled depot-level maintenance versus contractor controlled depot-level maintenance. The results of this study are representative of the F-117 only and do not reflect the value of outsourcing to the Air Force as a whole. A secondary goal was to develop research procedures that may be used in future multiple case studies. These procedures attempt to

highlight the cost and performance of organic support compared to the cost and performance of outsourcing in an effort to provide a method of quantifying the overall value attained from outsourcing. It is our hope that this triangulated comparative method can be used to evaluate whether or not the Air Force is receiving a better overall value from outsourcing.

Criticisms of government estimating practices during outsourcing competitions arose from industry and initiated an effort to equalize estimating practices. Recently, the GAO published similar criticisms and has confirmed that the savings derived from outsourcing are not as great as originally projected (GAO Report, GAO/NSIAD-98-48, 1997). A recent decision to outsource the responsibility for depot level maintenance of the F-117 aircraft has made it possible to study a weapon system that transitioned from government control of sustainment functions to complete contractor control. By gathering actual cost and performance data and comparing it to the customer satisfaction questionnaire, we were able to determine if the data collected reflected the opinions of the customers. Further, by triangulating the cost and performance data and the opinion surveys we hoped to gain some insights into how best to shape value measures in order to promote *best value* decision-making in these critical support areas.

Investigative Questions

The investigative questions are designed to focus the research on an examination of contractor performance data, cost benefits, and perceived customer satisfaction.

1. Are the contract performance metrics good indicators of *better value*?
2. Has the decision to outsource F-117 depot-level maintenance provided a *better value* to the Air Force?

3. If outsourcing F-117 depot maintenance is an equal or better value, do we still want to give up the potential core capability?

Research Focus

The factors studied here are the differences in cost and performance resulting from the experience of having both organic and contractor controlled depot-level maintenance. The goal is to assess F-117 outsourcing to determine if it is a better value to the Air Force than organic support. The plan is to measure the actual differences in performance factors and then to triangulate the archival and secondary data, expert interviews, and customer satisfaction questionnaire results to increase the internal and external validity of this single case study (Yin, 1989). The focus then is to gather pertinent cost and other associated value factors through archival data analysis and compare them with the level of customer perceived value gathered from the customer satisfaction questionnaires. Once the data are analyzed, and shown to be either valid or invalid measures of the value of outsourcing, the researchers will make recommendations for further use of this information.

Assumptions

If the results of the archival data analysis and customer satisfaction questionnaires are consistent with our proposition that outsourcing is a better value than organic maintenance, it means that the decision to outsource was appropriate for the F-117 aircraft. The results we obtain are reliable only for this depot and this particular situation. If the results are not consistent with our proposition, or if the results of the questionnaire conflict with the archival data analysis, additional research may be required. A finding

inconsistent with our proposition would suggest that future decisions to outsource additional key government functions should be thoroughly researched. The most important aspect of this research is to determine if outsourcing the F-117 provided the best overall value to the government and to build a framework for future decision-makers to apply when confronted with a similar outsourcing decision.

Limitations

This study does not analyze the political or social confounds impacting decisions to outsource. Several comments have already been made about the inaccuracy of the methodology used to estimate costs during outsourcing competitions. The General Accounting Office (GAO) and the Office of Management and Budget (OMB) are currently researching how government costs are estimated for outsourcing competitions in an effort to solve the problem (GAO Report, GAO/NSIAD-97-86, 1997). Because these two agencies are pursuing a solution to the estimating problem, this research does not address that area. The researchers acknowledge that there are many difficulties with current cost estimation practices, and that their solution is beyond the scope of this research.

The outsourcing of the depot-level maintenance of the F-117 is a unique situation. There was no competition between the private and public sector because the base was authorized for closure; and although there was a most efficient organization cost estimated completed, it was not used as a baseline for cost comparison purposes because of a lack of confidence in its accuracy.

Definitions

Key terms and definitions necessary to understand the major aspects of this research are briefly summarized below. Complete definitions of these terms are found in Appendix A.

Outsourcing - is the use of federal funds to pay a private company to do defense work or provide a service for a defense activity (GAO Report, GAO/NSAID-97-86, 1997: 2).

Privatization - the complete transfer of ownership and management of a function to the private sector, but DOD pays for the services associated with the function (GAO Report, GAO/NSAID-97-86, 1997: 2).

Better Value – a construct, in this framework, that is measured by whether or not there are actual improvements in cost, mission capable ratings (MCR's), quality, timeliness, and reliability of depot repairs.

Modernization - a key goal of the Air Force leadership, outlined in Joint Vision 2001, to replace or upgrade the aging Air Force weapon systems (Defense Issues, 1996: 1&2).

Inherently Governmental Function - "a function that is so intimately related to the public interest as to mandate performance by Government employees" (GAO Report, GAO/NSAID-97-86, 1997: 2).

Total Non Mission Capable Supply Rate – (TNMCS) is based upon the percentage of aircraft not mission capable due to supply. It is calculated monthly to establish a 12-month moving average (F-117 TSPR Performance Metrics, 1998).

MICAP Delivery - MICAP response time will be calculated monthly to establish a twelve month moving average. This metric is based upon the time taken by LMSW to deliver parts necessary to perform the mission to HAFB (F-117 TSPR Performance Metrics, 1998).

RSP Kit Fill Rate - RSP Kit Fill Rates will be calculated monthly to establish a 12-month moving average. This metric is based upon the total number of pieces on hand in both A and B kits divided by the total number of pieces authorized (F-117 TSPR Performance Metrics, 1998).

Depot Quality - is calculated by individual aircraft using a weighted point system that is based upon the number of major and minor discrepancies found after the contractor has requested DCMC sign-off for closure (F-117 TSPR Performance Metrics, 1998).

Depot Delivery - The depot delivery metric is calculated for each aircraft and is based upon the total number of days each aircraft fails to deliver on time (F-117 TSPR Performance Metrics, 1998).

Delinquent Efficiency Reports (DRs) - Delinquency tracking is performed monthly to establish a 12-month moving average. This metric is based on the average number of delinquent DRs (F-117 TSPR Performance Metrics, 1998).

Chapter Summary

Although outsourcing has been practiced for many years, the Air Force's loss of base closures as its primary means of saving force modernization dollars increased the emphasis on the use of outsourcing. Originally, proponents claimed that millions of

dollars could be saved by outsourcing; however, recent GAO audits suggest the savings are less than proposed (GAO Report, GAO/GGD 90-58, 1990). Air Force leaders are now asking researchers if they can measure whether outsourcing is a *better value* than maintaining a capability in-house. This thesis uses the triangulation of archival cost and performance data, expert interviews with those involved in the decision to outsource, and a customer satisfaction questionnaire to determine the value of outsourcing the depot-level maintenance of the F-117 to the DoD.

II. The Progression of Outsourcing

Chapter Overview

This chapter briefly discusses the history of outsourcing within private industry and the Department of Defense, and then highlights some of the most recent outsourcing developments. The chapter continues with a review of *make or buy* decisions. Then it discusses the reasons why outsourcing has become the chosen method of cost savings. Next, it looks at regulatory and policy guidance. Then it examines some of the recent problems and developments in how the Air Force plans to use outsourcing to save the money needed to modernize its force, and methods for determining its value. Finally, it addresses the decision to place F-117 depot-level maintenance under the direct control of the contractor.

History of Outsourcing

The move towards outsourcing is not a recent phenomena. For over 40 years the government has looked for ways to optimize its budgets.

> Since 1955, federal agencies have been encouraged to obtain goods and services from the private sector through outsourcing. In 1966, the Office of Management and Budget (OMB) issued circular A-76, which established the federal policy for the government's performance of commercial activities. In a 1983 supplemental handbook, OMB established procedures for determining whether commercial activities should be outsourced. (GAO Report, GAO/NSIAD 97-86, 15, 1997)

The end of the Cold War brought sweeping changes throughout the Department of Defense including decreasing budgets, manpower, and resources. To deal with these changes "the Department of Defense must meet three major challenges defined

in Joint Vision 2001: readiness, quality of life, and weapons modernization" (Armed Forces Information Service: 2, 1996). Sound business judgement must be employed when evaluating the risks involved in making the determination to outsource.

To Make or Not to Make

In his article "A Guide to Logistics Outsourcing," author Robert Bowman discusses the issues of outsourcing and warns:

> Outsourcing isn't for everyone. It isn't for those for whom logistics is a core competency or one that is essential to winning and retaining customers. Companies looking to make that initial determination must ask themselves a series of key questions: (1) What are my current strategic objectives regarding services and costs; (2) Which activities should be "owned," and which should be outsourced; and (3) Should "owned" resources be reconfigured? If so how? (Bowman, 1997: 34-36)

The basic reasons for deciding whether to make or buy should not be based on cost alone. Many factors need to be considered. "You concentrate on your core competencies, and outsource what other companies can do better than you" (Lear-Olimpi, 1997: 40). "Outsourcing is often thought of as a cost-cutting tactic, but it may cost the same as doing things yourself; the savings may be in cutting cycle or delivery times, moving products faster or primarily in not doing something wrong" (Lear-Olimpi, 1997: 42). "Companies often make parts out of a sense of corporate responsibility – namely a desire to preserve jobs" (Venkatesan, 1992: 100). This type of thinking can quickly put a company in financial trouble. DoD is not unlike private industry when it comes to making a decision whether to make or buy a needed resource. Resources are limited within both industry and DoD and these limited resources must be judiciously expended.

The DoD must ensure that decisions regarding outsourcing are made based on sound business practices.

Companies report that outsourcing enables them to focus on their core competencies; improve service quality, responsiveness, and agility; obtain access to new technologies; and employ more efficient business practices. Competitive forces have encouraged the creation of entire new industries to meet the demand for specialized services. "In 1996, these service industries will generate an estimated $100 billion in sales" (Armed Forces Information Service, 1996: 2). Surveys performed by a range of organizations all document the trend toward more outsourcing.

> Some examples include: (1) A 1994 study by Pitney Bowes Management Services found that 77 percent of 100 Fortune 500 firms surveyed outsourced some aspect of their business support services; (2) A 1992 study of 1200 companies conducted by the Outsourcing Institute found that 50 percent of firms with information technology budgets over $5 million are either outsourcing or actively considering it; (3) A 1994 study conducted by KPMG-Peat Marwick of 309 Fortune 1000 companies found that 48 percent outsourced warehousing functions: and (4) A 1994 study conducted by the Olsten Corp. of 400 firms found that 45 percent outsourced payroll management functions. (Armed Forces Information Service, 1996: 7)

Studies suggest that many local governments, including those of Chicago, Indianapolis, Los Angeles, Philadelphia, and San Francisco, have used outsourcing as a way to lower costs and improve customer service.

The myriad of ways to outsource makes defining privatization, the government version of make or buy, difficult. In its purest form, the term refers to the shifting of the production of a good or the provision of a service from the government to the private sector, often by selling government owned assets. According to Elaine Kamarck, who

heads Vice President Gore's National Performance Review, "Outsourcing means purely divesting the government function" (Shoop, 1995: 17). Most definitions of privatization are more expansive, including any action that involves exposing the operations of government to the commercial market. It is often difficult to tell where government ends and the private sector begins. The following definitions are provided in an article by Tom Shoop entitled Going, Going, Gone:

-*Selling Out* – Sales of federal assets. Example: Naval petroleum Reserves.

-*Service Shutdown* – The government discontinues or gives up responsibility for a service. Example: Office of Personnel Management's training operation.

-*Quasi-Government* – The netherworld of federal corporations, government sponsored enterprises and quasi-government organizations. Often an intermediate step on the road to full privatization. Examples: Amtrak, Postal Service.

-*Public-Private Partnerships* – Any effort in which government and private organizations share ownership of assets and operational responsibilities. Includes voucher systems, franchise arrangements-even volunteer programs. Examples: Food stamps, Medicare, and job-training programs.

-*Contracting Out* – The most common form of privatization: shifting the provision of a good or service to the private sector by putting it out for competitive bid. Examples: everything from construction of aircraft carriers and management of nuclear weapons facilities to provision of landscaping services (Shoop, 1995: 17).

Regulatory and Policy Guidance

Various laws contained in the National Defense Authorization Act for fiscal years 1988-89 inhibited DoD's ability to outsource. Public Law 100-180, otherwise known as the Nichols Amendment, allowed installation commanders to determine whether to pursue outsourcing. The Department of Defense Appropriations Act for fiscal year 1991 contained Public Law 101-511, which prohibited funding for lengthy A-76 studies. The National Defense Authorization Act for 1993-1994 prohibited DoD from entering into contracts resulting from cost studies done under OMB Circular A-76, from October 23, 1992 to April 1, 1994 (Armed Forces Information Service, 1996). Even though these prohibitions have all lapsed, a number of provisions in Title 10, chapter 146 continue to have an impact on the outsourcing decision. They include:

-Cost comparison studies are required if outsourcing impacts more than 10 positions.
-Congress must be notified of the results of any A-76 studies involving more than 45 civilians.
-Annual reports to Congress are required on outsourcing.
-DoD is prohibited from outsourcing firefighters or security guards at military installations.
-Outsourcing is prohibited for functions that are considered inherently governmental.
-Military services must maintain the capability to accomplish 60% of their depot-level maintenance organically.

Recent Problems and Concerns Regarding Outsourcing

The NPR and challenges identified in Joint Vision 2001 have been the main drivers for recent acquisition streamlining legislation including: The Federal Acquisition Streamling Act (FASA) of 1994, The Federal Acquisition Reform Act (FARA) of 1996, and recent DoD 5000.1 and 5000.2 directives. Previous annual budgeting practices did

not properly motivate government organizations to cut their expenses. If they did not spend their entire annual budget, then the next year's budget was reduced accordingly. This promoted waste and massive spending sprees at the end of the fiscal year. To correct these inefficiencies, the Deputy Secretary of Defense signed a memorandum on February 26, 1996 stating that "Resources saved through these initiatives during the POM process will not be decremented from your out-year budgets and should instead be applied to your modernization priorities" (Armed Forces Information Service, 1996: 25). These pieces of acquisition legislation streamline the acquisition process, but do not entirely eliminate the road blocks to outsourcing and privatization. Title 10 of the United States Code (10 U.S.C.) still includes many hurdles to achieving the necessary funds to meet the three challenges identified in Joint Vision 2001:

> Provisions of law that impede achieving the benefits of minimized costs and requisite readiness include: (1) Section 2466 of 10 U.S.C. requires 60 percent of depot maintenance to be performed by Federal Employees; (2) Section 2464 of 10 U.S.C. defines Core Logistics Functions in terms of workload performed at specified facilities. This creates an artificial constraint that hinders the DoD's ability to effectively manage its depot maintenance facilities; (3) Section 2469 of 10 U.S.C. requires public/private competitions before any workload in excess of $3 million can be transferred to the private sector; (4) Section 2461 of 10 U.S.C. requires four separate reports that DoD feels are unnecessary. In addition, the extensive "how to" requirements create disincentives for DoD components to pursue outsourcing. It also restricts the use of funds for cost comparison studies that are not completed within 24 months; (5) Section 8020 of the DoD Appropriations Act, 1996 requires the same detailed analysis of a function involving 10 employees as it does a function involving 1,000 employees; and (6) Section 317 of the National Defense Authorization Act for Fiscal Year 1987 exempts specific installations for political or other reasons. (Armed Forces Information Service, 1996: 15)

Recent Developments

"In the 17-year period between 1979 and 1996, the Defense Department reviewed about 90,000 positions for transfer to the private sector; through 2005, the department says it will review 229,000 positions" (Peters, 1999: 20). DoD will compete more than twice as many positions between 1997 and 2005 in one-third the time. Figure 1 shows the number of positions planned for A-76 competitions between 1997 and 2002.

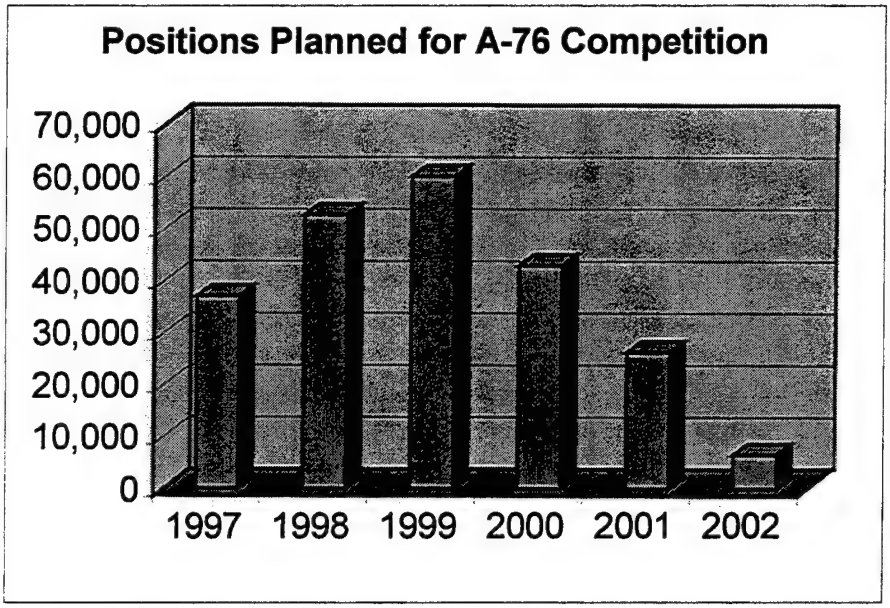


Figure 1: Positions Planned for A-76 Competition (Peters, 1999:22)

History has shown that no matter who wins the competition, jobs will be reduced. DoD competed 5,757 positions from October 1995 to March 1998. Table 1 shows that while sixty percent of the competitions were awarded to contractors, 85 percent of the positions were lost. There was a reduction in manpower even in those instances when the government was the winner of the competition.

Table 1. A-76 Competition Results From Oct. 1995 to Mar. 1998 (Peters, 1999: 24)

Tough Competition				
Component	**A-76 Studies Completed**	**Contractor Awarded**	**Total Positions Competed**	**Total Positions Reduced**
Army	3	2 (67%)	94	78
Navy	3	3 (100%)	154	124
Air Force	41	24 (59%)	4,895	3,671
Defense Commissary Agency	4	3 (75%)	95	91
Defense Finance and Accounting Service	2	0	519	257
Total	53	32 (60%)	5,757	4,221

Last year Congress passed the Federal Activities Inventory Reform (FAIR) Act which put even more pressure on federal agencies to outsource. This Act requires Defense and other executive agencies to publish annually a list of activities that are not inherently governmental but that are performed by a government source. This Act paves the way for agencies to contract even more work. "Agencies won't publish their commercial activities list until June 30, but word on the street is that DoD's inventory will be the most aggressive by far" (Peters, 1999: 22).

F-117 Developments

In July 1995, General Henry Viccellio, Commander, Air Force Materiel Command, cited the F-117 as a candidate for "Contractor Logistics Support (CLS) for Life" to reduce total operating costs. This proposal eventually led to the decision to outsource F-117 sustainment tasks that were being performed by the Sacremento Air Logistics Center. The Total System Performance Responsibility (TSPR) contract, signed

in October, 1998, transitioned responsibility for the following tasks from the government to the contractor: item management, material management, warehousing, transportation, supply support, sustaining engineering, program management, technical orders, production management, configuration management, data management, test and evaluation management, and safety. The transition of these responsibilities, in addition to the actual maintenance the contractor was already performing, gave total control and responsibility for depot-level maintenance to the contractor.

Recently, General George Babbitt, the Commander of AFMC, and the Program Executive Officer for fighter/bombers, General Bolton, requested the F-117 System Program Office to do a "business case." The business case is an effort to go back to the beginning before the decision to outsource sustainment tasks was made in an effort to validate the assumptions used in the decision. The intent is to establish a baseline so they can compare projected savings with actual savings. The Program Office is interested in reviewing the methodology and results of this thesis effort to assist it in completing their business case.

Chapter Summary

Recent GAO Reports and warnings from the corporate sector about outsourcing have created the need for this research study (GAO Report, GAO/NSIAD-98-48, 1997). The GAO report entitled "Savings Achievable But Defense Science Board's Projections Are Overstated" has sparked concern among Air Force leadership because many organizations have included these projected savings in their out-year budgets. In addition, in a report to the Senate Armed Services Committee on October 6th, 1998,

Secretary of Defense William S. Cohen stated: "Without additional (base) closures we will not achieve the $20 billion in projected savings in the years where some major systems are scheduled to come on line" (Garamone, 1998: 25). The GAO report and Secretary Cohen's statement are driving the desire for Air Force leaders to quantify the savings that they are achieving from outsourcing. Although a great deal has been written about why you should outsource, how you should outsource, and when you should outsource, there has been nothing written on how to measure and /or determine whether or not outsourcing is a *better overall value* than maintaining the in-house capability. The purpose of this study is to explore traditional techniques in business research to determine whether: 1) one can develop a reliable snapshot of how effective outsourcing is as an alternative to organic solutions; and 2) determine whether analytical lessons learned from this application can be generalized and applied to future valuation assessments.

III. Methodology

Chapter Overview

As stated in previous sections of this thesis, the goal of this research is to determine whether or not outsourcing of depot-level maintenance is a better value than organically performed depot-level maintenance. Our proposition is that outsourcing the F-117 depot-level maintenance is a better value than organically performed maintenance. A finding inconsistent with this proposition suggests that more research is necessary. Archival data reflecting cost and key performance indicators from the last two years were compared to identical cost and performance factors reflecting contractor performance since inception of the Total System Performance Responsibility (TSPR) contract. We sought to measure perceived customer satisfaction by comparing satisfaction levels before and after the TSPR contract was awarded. By comparing customer satisfaction data to the results of the archival analysis, we should be able to determine if the Air Force is, or is not, obtaining a better value through outsourcing.

Research Approach

To test our proposition, we used archival data to compare the government's performance to the contractor's performance. Technical performance was measured against the metrics tracked by Air Combat Command (ACC) with the Monthly Aircraft Logistics Indicators Report (9302 Report), a report used to measure logistics indicators for all ACC aircraft. These performance metrics include: mission capable (MC) rate, total non-mission capable supply (TNMCS) rate, mission capable (MICAP) delivery, replacement spare parts (RSP) kit fill rate, depot delivery, depot quality, deficiency report

(DR) response rate, and weapon system trainer (WST) availability. These same performance metrics, with the exception of the MC rate, are contained in the TSPR contract and are used to gauge the contractor's performance. Our evaluation of these factors considered the number of monthly sorties flown. The amount of award fee the contractor receives is dependent upon how well it performs against these metrics. We are using actual cost and performance data from fiscal years 1997 and 1998. We believe that, due to the time of contractor take over, age of the fleet, number of sorties flown, and total aircraft in the inventory during this period, that the most common conditions exist to make a fair comparison. Earlier data is available; however, we cannot verify its reliability and it would require the leveling of several confounds. It must be noted that the contractor has always performed the actual hands-on maintenance due to the unique nature of the aircraft material. Prior to the decision to have the contractor assume total responsibility for depot-level maintenance, the government controlled development and acquisition, program management, sustainment, budgeting, contracting, and security. Sustainment tasks include item management, material management, warehousing, transportation, supply support, sustaining engineering, program management, tech orders, production management, configuration management, data management, test and evaluation management, and safety. Under the TSPR contract awarded 1 October 1998 (beginning FY 1999), the contractor assumed all sustainment responsibilities.

To supplement the archival analysis of before and after TSPR cost and performance data, we supported our findings by soliciting customer satisfaction information. To examine the customer's perceived increase or decrease in value, we questioned the customers using a Likert five-point comparative ranking scale (Cooper

and Emory, 1995). This questionnaire serves two purposes. First, the questionnaire results are key indicators of customer satisfaction both before and after the TSPR contract was awarded. This comparison assisted us in our attempt to examine whether or not outsourcing is a better value. Second, the questionnaire is an indicator of the validity of the performance indicators used to measure the contractor's performance. For example, if the archival data indicate that the contractor is meeting or exceeding all performance indicators, but the customer is not satisfied with performance, this may indicate that the wrong metrics are being used to measure performance.

Instrument Implementation

The questionnaire is a short, thirteen question Likert-type questionnaire that was directed at those with knowledge of the depot supply process and how it was affected by the award of the TSPR contract. These groups include supply, expeditor, inspection and acceptance, and senior maintenance personnel who track or are aware of the differences in the level of performance. The individuals are from the same units that provide input to the award fee board. Originally, we planned on selecting a random sample of these groups, but were unable to obtain a list of all candidates available in these groups due to ongoing deployment operations. The Commander of the F-117 fighter wing at Holloman AFB forwarded the questionnaire by email and tasked his leadership to forward it to key personnel. The number of personnel available to answer the questionnaire was limited due to an increased operations tempo caused by the deployment of unit personnel to Kosovo. While not random, we believe the selection of participants is valid for purposes of our study. The distribution of questionnaires to *key* personnel should improve the

quality of responses. Once responses were received, the data were analyzed to show how each value determinant affected the response variable. Because outsourcing is viewed by some as a sensitive subject, we addressed concerns of anonymity and fear of retribution by ensuring that respondents' names were kept anonymous.

Data Collection Process

The questionnaire is provided in Appendix B, and relates primarily to established performance parameters. It also deals with the perception of overall improved efficiency, quality, and working relationship between the depot and the flight-line maintenance personnel. The target population of the questionnaire was those with knowledge of the depot supply process and how the award of the TSPR contract affected it. These personnel had knowledge of factors relating to MC rates, TNMCS rates, MICAP delivery, RSP Kit fill rates, depot delivery, depot quality, DR response rates, and WST availability. They are also in the position to determine if these are the proper factors to use to measure the contractor's performance.

Limitations

The scope of this study is limited by several factors. First, the contractor has only been responsible for total system performance for seven months and for the last three months has been supporting deployments to Kosovo. This is important because under TSPR some of the performance metrics are relaxed until the aircraft return from the theatre. Also, upon inception of the contract, the contractor assumed control of a warehouse full of government acquired spare parts. In addition, the contractor was not

held accountable for performance metrics on aircraft in process during the change over. As a result, the first quarter data does not accurately reflect the contractor's ability to perform. Second, because of the recent deployments, operations tempo data normally available is considered sensitive and therefore not accounted for in this analysis. Third, we realize the historical cost data being compared may not accurately reflect a comparison against the government's most efficient organization (MEO) costs. Although the F-117 Program Office did accomplish an MEO, it was not used as a cost baseline because the decision was already made to have the jobs remain in California. Also, other costs, such as employment relocation programs, early retirement incentives, and additional DCMC involvement, are not accounted for in the SPO's estimate of the costs to convert sustainment to contractor control. Finally, we were unable to analyze the impact of spares funding levels during the before and after periods, which could have a significant impact on the ability of either party to meet or exceed the performance metrics.

Chapter Summary

This chapter provides an overview of our research methodology. It explains our research approach, instrument implementation, data collection, and limiting factors. The purpose of this chapter was to prepare the reader for the detailed analysis that appears in Chapter 4, and make the reader aware of the factors that limit this research effort.

IV. Analysis and Results

Chapter Overview

The purpose of this analysis is to examine if outsourcing of the F-117 sustainment effort is a better value to the government than organic support. The value of this information is that the AF decision-maker will have a single case study that will provide information useful for making future outsourcing decisions.

The data are presented in the following sequence. First, a detailed cost analysis is presented examining the actual and perceived financial value to the AF. Next, we present results comparing performance metrics. This is followed by a discussion of the customer satisfaction questionnaires and expert interviews. Finally, we present a triangulation of the cost, performance, and customer satisfaction information.

Cost Comparison

A detailed analysis comparing costs, MC rates, TNMCS rates, MICAP delivery, RSP Kit fill rate, depot delivery, depot quality, DR response, and WST availability before and after sustainment responsibilities were transferred to the contractor was performed. Actual cost and performance data from fiscal years 1997 and 1998 were compared to contractor performance data from October 1998 through April 1999. The results of this analysis were compared to the results of the customer satisfaction questionnaire and expert interviews.

Figure 2 and Table 2 are graphical and tabular representations of the program office's estimate of savings resulting from the transfer of sustainment responsibilities from the government to a contractor. The figure identifies two potential savings profiles;

one assumes stable F-117 program funding and the other assumes unstable funding. As of the completion date of this report, stable funding beyond FY99 has not been authorized. The "requirement without TSPR" costs are an estimate of what it would have cost the government to accomplish sustainment efforts without the TSPR contract. The amounts are calculated using FY98 actual government sustainment costs as a baseline, escalated three percent per year to cover projected inflation. The F-117 Program Office made a business decision to not escalate Government personnel costs. This decision tends to understate projected savings.

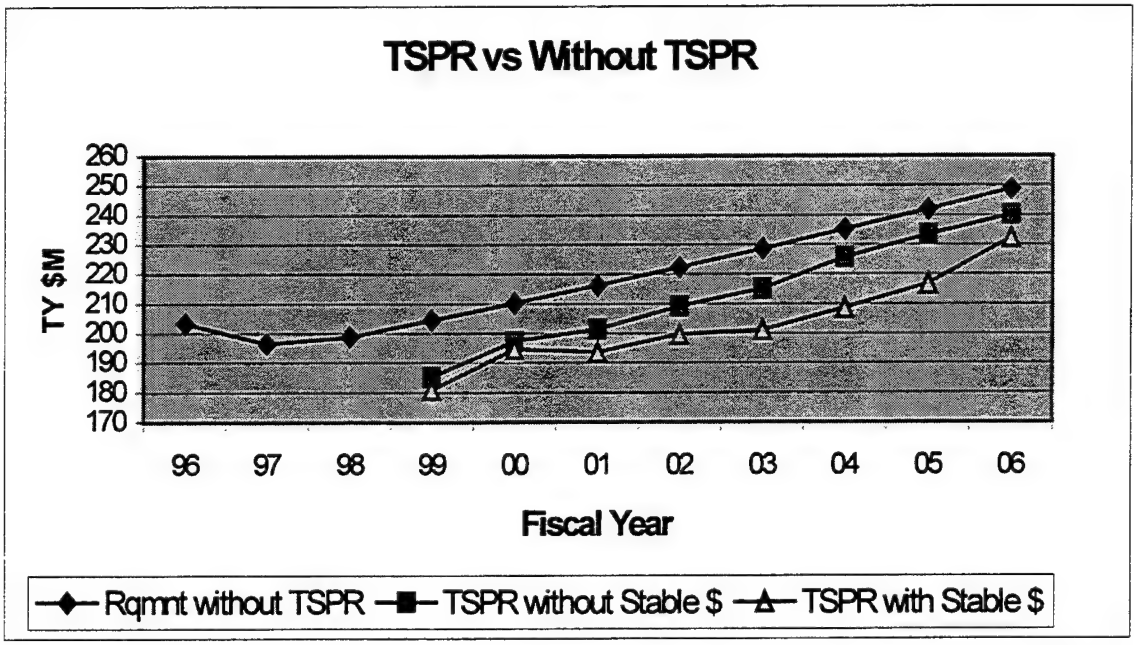


Figure 2. Program Office's Estimate of Savings From TSPR (F-117 Program Office)

Table 2. Program Office's Estimate of Savings From TSPR (F-117 Program Office)

TSPR vs Without TSPR Cost Comparison vs Inflation					
Fiscal Year	Rqmnts without TSPR	SPO West Manning	Tot Rqmnts without TSPR	TSPR without Stable $	TSPR with Stable $
FY96	191.8	11.58	203.4		
FY97	184.9	11.58	196.5		
FY98	187.3	11.64	198.9		
FY99	192.9	11.64	204.5	185.3	181
FY00	198.7	11.64	210.3	197.4	194.7
FY01	204.7	11.64	216.3	201.5	193.7
FY02	210.8	11.64	222.4	209.2	199.7
FY03	217.1	11.64	228.7	215.2	201.2
FY04	223.6	11.64	235.2	225.7	208.6
FY05	230.4	11.64	242	233.5	216.8
FY06	237.3	11.64	248.9	240.3	232.4
Tot 99-06	1715.5	93.1	1808.6	1708.1	1628.1
	Savings	TSPR w/o Stable $	100.5	100.5	
	99-06	TSPR w/ Stable $	180.5		180.5
		This reduction is an estimate of the reduction of ALC personnal			-2.94
					-177.6

From Table 2, above, the AF projected savings is $177.6 million over the life of the sustainment contract. This level of projected savings assumes the government is able to fully fund the TSPR contract so the contractor can negotiate long-term contractual relationships with their subcontractors and can implement other long-term cost savings initiatives. Without full funding the contract would need to be renegotiated resulting in a loss of savings. The AF calculated the projected savings by developing an estimate of what it would have cost the government to provide the identical level of support and compared this estimate to the actual contract amount at target price. The AF estimate was developed by escalating the AF sustainment costs for fiscal year 1998 by three

percent per year projected over the life of the contract. The savings are calculated by subtracting the actual contract amount, at target price, from the government's estimate of what it would have cost the AF to accomplish this same level of work. The only direct comparison that can be made is between the estimated cost for the government to provide sustainment services during FY99 if the TSPR contract was not awarded and the projected contract cost for FY99. The government estimate was based on the assumption that the same level of service would be provided by the government. It must be noted that only seven months of cost history is available from the TSPR contract. The amount used for comparison purposes is the estimate to complete provided by the TSPR contractor. The projected cost under TSPR based on the estimate to complete for fiscal year 1999 equates to $177.6 million. The contract contains a provision that encourages contractor efficiencies by sharing any savings below the $181 million target price 50/50 between the government and the contractor. The contractor is projecting a $3.4 million under-run, of which the government share is $1.7 million. The savings to the government for FY99 equates to $25.2 million. This represents the difference between the government estimate of what it would have cost to perform the effort minus the contract price at target, plus the government's share of the under-run.

In conclusion, the TSPR contract appears to offer significant financial savings to the government as compared to what it would have cost the government to accomplish sustainment tasks at the same level of support. Although there is no guarantee that contractor cost performance will be better or worse during the life of the contract; the analysis provides an initial look at contractor cost performance from which a projection of future savings, if any, can be estimated.

Technical Performance

Technical performance was gauged by comparing the performance before sustainment responsibility was transferred to the contractor with performance after transfer. Performance was measured against pre-established standards. The same standards were applied with two exceptions. The TSPR contractor is not held accountable for meeting the MC rate because many of the factors influencing this rate are under government control. Also, the standard for Total Non-Mission Capable Supply (TNMCS) was reduced from seven percent to five percent for contractor performance. The contractor is held to a higher standard because the AF retained responsibility for parts the government must supply.

Table 3 presents a comparison of the government's performance for fiscal years 1997 and 1998 and contractor performance for the first seven months of fiscal year 1999 under TSPR. The comparison is based on the performance metrics in the contract with the exception of the MC rate.

Table 3: Performance Comparison Non-TSPR vs TSPR (F-117 Performance Metrics)

		Fiscal Year 1997											
Metric	STD	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
MC Rate (%)	80	83.3	84.8	87.2	85	81.3	83.6	83.8	86.4	82.6	83.7	83.7	81.4
TNMCS Rate (%)	7	5.8	6.0	4.7	5	5.3	3.2	1.8	3.4	4.7	5.1	4.4	3.6
MICAP Del (Hrs)	72				67.2	41.3	54.5	45.8	66.2	72.1	58.0	74.9	75.7
RSP Fill Rate (%)	96				98.9	99.8	99.8	99.7	99.9	99.4	98.9	99.5	93.6
Depot Del (Days)	1												
Depot Qlty (# Disc)	4:10												
DR Resp (Days)	5				0	0	0	0	0	0	0	0	0
WST Avail (%)	97				100	99.4	100	100	100	100	100.0	100	98.9

		Fiscal Year 1998											
Metric	STD	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
MC Rate (%)	80	76.1	76.2	76.9	75.4	77.1	77.9	82.1	83.3	82.3	78.9	77.9	82.9
TNMCS Rate (%)	7	4.1	5.4	7.1	6.4	7.9	6.4	6.3	5.5	4.9	5.2	5.5	5.4
MICAP Del (Hrs)	72	47.1	63.4	75.1	57.8	61.4	59.9	43.3	69.3	148.5	44.7	45.7	43.5
RSP Fill Rate (%)	96	96.8	100	100	100	100	99	99.3	99.7	99.3	99.6	99.4	98
Depot Del (Days)	1	14	7.5	0	0	0	0	0	0	0	0	0	0
Depot Qlty (# Disc)	4:10	2:4:1:1	2:6:2:2	2:4:1:0	2:2:2:3	3:6:2:3	2:2:8:2	1:8:8:3	2:4:2:3	1:8:1:0	1:0:1:6	1:6:6:3	1:0:1:0
DR Resp (Days)	5	0	0	0	0	0	0	0	0	0	0	0	0
WST Avail (%)	97	100	100	100	100	100	100	99.4	100	100	98.9	100	99.3

		Fiscal Year 1999											
Metric	STD	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
MC Rate (%)	80	84.3	82.4	84.9	85.4	82.5	86.7	79.3					
TNMCS Rate (%)	5	3.1	3.4	1.4	2	1.7	1.7	5.5					
MICAP Del (Hrs)	72	20.9	28.2	30.2	29.5	31.3	32.2	47.1					
RSP Fill Rate (%)	96	99	99.2	99.1	99.1	99	98.8	99.0					
Depot Del (Days)	1	0	0	0	0	0	0	0					
Depot Qlty (# Disc)	4:10	2:4:0:8	2:4:0:8	2:4:0:8	2:0:4:0	2:0:4:0	2:0:4:0	3:3	** Oct – Mar questionable				
DR Resp (Days)	5	0	0	0	0	0	0	0					
WST Avail (%)	97	100	100	100	100	100	100	99.9					

Metric	MC Rate	TNMCS	MICAP Del	RSP Fill Rt	Depot Del	Depot Quality	DR Resp	WST
Std	80%	7% *	72 Hours	96%	1 Day	Majors:5 Minor:10	5 Delqnt	97%
Grn	>= 80%	<= 7%	<= 72	>= 96%	<= 1	<= 5:<= 10	<= 5	>= 97%
Yel	>=60%<80%	>7% <=11%	>72 <=180	>=87% <96%	>1 <=2	5<Maj<=8:10<Min<=16	>5 <=10	>=95% <97%
Red	<60%	>11%	>180	<87%	>2	Maj>8:Min>16	>=11	<95%

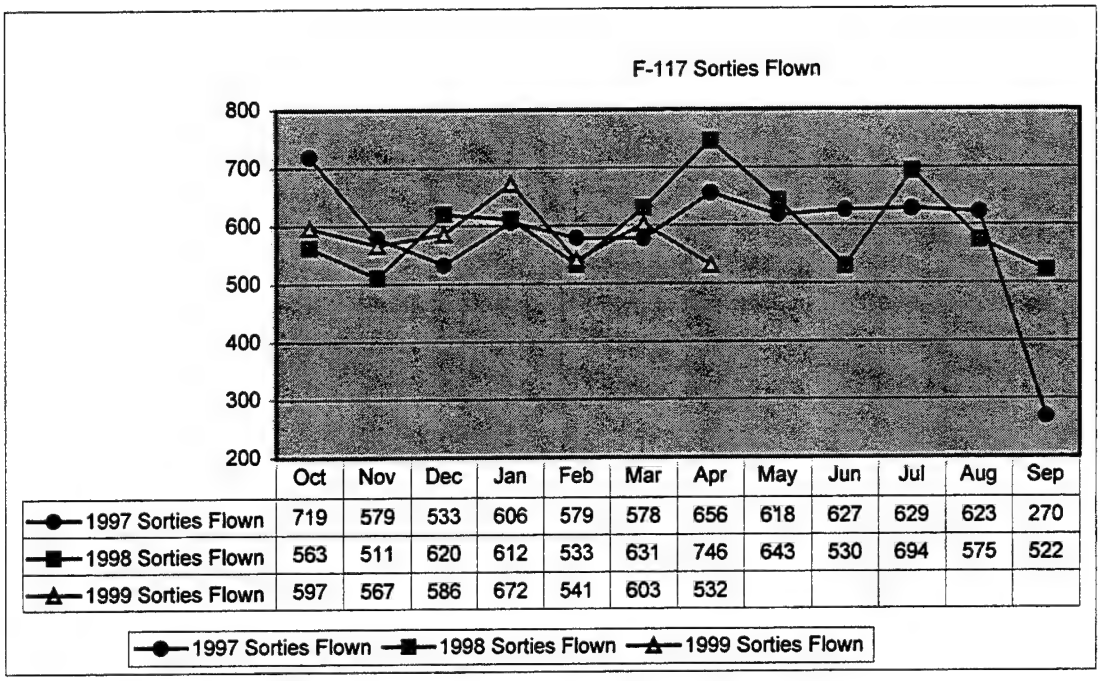
Table 4 compares the pre-TSPR average performance levels for fiscal years 1997 and 1998 with the contractor's average performance for the first seven months of fiscal year 1999. The analysis of the data in Tables 3 and 4 indicates that from a technical

perspective, performance was generally satisfactory both prior to and after transfer of sustainment responsibility to the contractor. The performance indicators for the seven months since the TSPR contract was signed are higher for four of the seven performance indicators used to measure the contractor under the TSPR contract, and tied for a fifth. Note that depot quality is a single performance indicator; however, major and minor discrepancies have been separated for ease of comparison.

Table 4: Average Performance Levels

Metric	Avg 97	Avg 98	Avg 99
MC Rate (%)	83.90	78.92	83.56
TNMCS Rate (%)	4.39	5.98	2.69
MICAP Delivery(Hrs)	61.74	63.31	38.57
RSP Fill Rate (%)	98.74	99.23	99.03
Depot Delivery (Days)	N/A	1.79	0.00
Depot Quality Majors	N/A	2.07	2.19
Depot Quality Minors	N/A	1.43	2.49
DR Response (Days)	0.11	0.00	0.00
WST Availability (%)	99.81	99.80	99.99

The different lengths of the performance periods pose concerns, but by comparing sortie rates we can reasonably correlate the two data points. Figure 3 shows the level of sorties flown during the periods we are comparing. With the exception of September 1997, the sortie rates have been relatively stable each month. The data for that month is much lower because the fleet was grounded after an aircraft crashed. Figure 3 is significant because it indicates that sustainment tasks required during fiscal years 97 and 98 and the first seven months of fiscal year 99 are based on comparable sortie rates.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1997 Sorties Flown	719	579	533	606	579	578	656	618	627	629	623	270
1998 Sorties Flown	563	511	620	612	533	631	746	643	530	694	575	522
1999 Sorties Flown	597	567	586	672	541	603	532					

Figure 3: F-117 Sorties Flown by Fiscal Year

From Figure 3 above, the average number of monthly sorties for FY97 is 613 (excluding September), 555 for FY98, and 585 for FY99. The results and analysis of each performance indicator follow.

Mission Capable Rate: The standard is 80%. Several factors comprise this rate, some of which are not under contractor control. Nonetheless, we are including this performance indicator in our analysis because many of the metrics for which the contractor is held accountable significantly impact this rate. The average mission capable rate for the first seven months under TSPR is 83.56%. This rate, statistically, is not significantly different from the pre-TSPR FY97 rate, but is a 5.9% improvement over the observed performance during FY98. The monthly rate under TSPR exceeds the standard on average; however, the standard was not met for the month of April 1999. We cannot determine if the failure to meet standard was affected by contractor performance. A

number of F-117's are deployed to Kosovo, significantly stretching the supply line, and more than likely having an impact on this factor.

Total Non Mission Capable Supply: The standard set by ACC is 7%. The standard under TSPR is 5% because the government retains responsibility for furnishing parts managed by the other services or the Defense Logistics Agency. The average monthly rate under TSPR is 2.69%, which easily exceeds the standard; however, the contractor failed to satisfy the standard during the month of April 1999. Again, this failure could be attributed, at least in part, to the Kosovo deployment. The rate under TSPR exceeds the 5% standard by 46.2%, the pre-TSPR rate for FY97 exceeds the 7% standard by 37.3%, and the FY98 rate exceeds the 7% standard by 14.6%.

MICAP Delivery: The standard is 72 hours. The average monthly performance under TSPR of 38.57 hours is a 37.5% improvement over the pre-TSPR FY97 rate and a 39% improvement over FY98 performance. The contractor has far exceeded the standard of 72 hours every month (except for the first month); however, it must be noted that the contractor was not held accountable for aircraft work in process until February 1999. A significant increase in the number of hours to deliver during the month of April 1999 was thought to be because of one particular part. Delivery time is expected to drop again in May.

RSP Kit Fill Rate: The standard for this performance indicator is 96%. The average monthly RSP Kit fill rate under TSPR, 99.03%, exceeds the 96% standard. There is no statistically significant difference between performance under TSPR and pre-TSPR. The contractor easily met the standard each of the seven months.

Depot Delivery: The standard for this performance indicator is 1 day. The performance under TSPR exceeded the standard each of the seven months. Performance under TSPR exceeded the pre-TSPR FY98 performance by an average of 1.79 days per month. The government's performance exceeded the standard all but the first two months. It took 14 days to deliver in October and 7.5 days to deliver in November; all other months were zero. Data is not available for this performance indicator for FY97.

Depot Quality: The standard for depot quality allows for four major, and ten minor discrepancies. Although there is no statistically significant difference between performance under TSPR and performance during FY98 in regard to major discrepancies, performance under TSPR exceeded the standard each of the seven months. Performance under TSPR also exceeds the standard of ten minor discrepancies each of the seven months; however, performance under TSPR for minor discrepancies was 74.1% below the FY98 performance. Data is not available for FY97 for this performance indicator.

Delinquent Deficiency Reports: The standard for this performance indicator is 5 days. The performance under TSPR exceeded the standard each of the seven months. There is no statistically significant difference between performance under TSPR and performance during FY97 and FY98.

WST Availability: The standard for Weapon System Trainer availability is 97%. The performance under TSPR exceeded this standard each of the seven months. The performance level under TSPR was 100% every month except April 1999, when availability dropped slightly to 99.9%. There is no statistically significant difference between performance under TSPR and performance during FY97 and FY98.

Looking only at the seven performance indicators used to measure the TSPR contractor's performance, it would appear that there is little difference between average monthly performance before and after TSPR. We did not attempt to gauge the importance of the performance indicators; however, it should be noted that performance under TSPR was lower for depot quality than during the FY98 pre-TSPR period. In addition the mission capable rate under TSPR is below that experienced during FY97, but higher than that experienced during FY98. In conclusion, it appears that technical performance is not the controlling factor to determine if outsourcing sustainment tasks for the F-117 is a better value than organic support. Without the added value of significant cost savings, the decision to outsource could not be supported.

Questionnaire Results

The customer satisfaction questionnaire serves two purposes. First, the questionnaire results are key indicators of customer satisfaction both before and after the TSPR contract was awarded. This assisted us in our attempt to examine whether or not outsourcing is a better value. Second, the questionnaire is an indicator of the validity of the performance indicators used to measure the contractor's performance. For example, if the archival data indicate that the contractor is meeting or exceeding all performance indicators, but the customer is not satisfied with performance, this may indicate that the wrong metrics are being used to measure performance.

Our original plan was to telephonically interview a randomly selected sample from the total population of F-117 maintenance personnel. The Logistics Commander of the 49th Logistics Group informed us that the *hands-on* maintenance technicians would

have little, if any, insight into the differences in the performance indicators under TSPR compared to pre-TSPR. In addition, the Kosovo deployment and resultant increase in operations tempo has greatly increased the workload of F-117 maintenance personnel, further limiting our access to them. He proposed that we provide the questionnaire to senior level individuals only. We suggested he include personnel from supply, quality assurance, and expeditors along with the senior maintenance personnel. As a result, the Commander provided the questionnaire to all of the senior personnel from those four groups. The responses were gathered and forwarded to us via mail.

The questionnaire consists of thirteen questions. The first five questions capture demographic information such as rank, job title, years of experience working on the F-117, education level, and career skill level. The next seven questions measure the difference, as perceived by the customers, in the performance indicators used to measure both organic support prior to TSPR and contractor support under the TSPR contract. The final question is intended to examine if the performance indicators presently used to assess performance under TSPR are the best indicators of performance and to elicit suggestions for improving the performance indicators.

A total of 30 questionnaires were returned. Not all questions relating to the performance indicators were answered on each questionnaire. The number of responses range from 20 responses (out of 30) on question 9 to a maximum of 25 responses on questions 6 and 7. We can only speculate that respondents failed to answer certain questions because they lacked insight into performance in relation to the performance indicators. This is evidenced by some of the responses to question 13.

The analysis begins with question 6, which is the first question that measures the customer's perception of the difference in the quality of service received under TSPR compared to pre-TSPR. The analysis examines the results of each questionnaire response with respect to the performance indicators to determine whether or not the customer's perception matches the archival data collected. We examine the responses of the entire group first. If there are discrepancies between the questionnaire responses and the archival data, we will analyze other factors such as education level, skill level, and the number of years of experience working on the F-117 to see if there is any dependant variable relationship.

MC Rate: The questionnaire did not ask the perceived difference in MC rates because performance in the other areas being measured determines the MC rate. In addition, the contractor is not held accountable for this rate because many of the factors influencing this rate are under government control. By analyzing the results of each question and comparing it to the archival data we can reach conclusions regarding whether or not contractor performance impacts the MC rate.

TNMCS Rate: The archival analysis indicates that performance under TSPR exceeds the standard and is higher than performance during FY97 and FY98. Of the 30 respondents to the questionnaire, 1 reported that performance was much better, 11 reported somewhat better, 11 reported no change, 2 reported somewhat worse, and 5 failed to respond. The results of the questionnaire indicate that the customers perceive the contractors performance to be equal to or better than performance prior to TSPR for this performance indicator.

MICAP Delivery: The archival analysis indicates that performance under TSPR reduced the delivery time by more than half for the months of November through March, FY99. The responses to the questionnaire for this metric show that of the 30 respondents 6 reported a marginal decrease in performance, 14 reported no change, 5 reported somewhat of an increase in performance, and 5 failed to respond. The results of the questionnaire indicate that 19 of the 25 customers that responded to this question perceive the contractors performance to be equal to or better than performance prior to TSPR for this performance indicator. However, it must be noted that the contractor taking possession of the government's spare parts warehouse may have affected the first quarter data.

RSP Kit Fill Rate: The archival analysis indicates that performance under TSPR exceeds that experienced prior to TSPR during FY 97, but falls slightly short of the FY 98 performance rate. Performance under TSPR has exceeded the standard each of the seven months. The responses to the questionnaire for this metric show that of the 30 respondents, 1 indicates much better performance, 6 indicate somewhat better performance, 13 reported no change, 4 reported somewhat worse performance, and 6 failed to respond. The results of the questionnaire indicate that 20 of the 24 customers that responded to this question perceive that performance under TSPR to be equal to or better than performance prior to TSPR for this performance indicator.

Depot Delivery: The archival analysis indicates that performance under TSPR exceeds the pre-TSPR FY 98 performance and exceeds the standard for each of the seven months. Data are not available for this performance indicator for FY97. The responses to the questionnaire for this metric show that of the 30 respondents, 20 reported no

change, 1 reported somewhat of an increase in delivery time, and 9 failed to respond. The results of the questionnaire indicate that 20 of the 21 customers that responded to this question perceive no change in performance for this performance indicator.

Depot Quality: The archival analysis indicates that performance under TSPR exceeds the standard; however, it is slightly below the pre-TSPR performance during FY 98. FY 97 data was not available for this metric. Of the 30 respondents to the questionnaire, 5 reported a greatly decreased number of discrepancies, 1 reported somewhat of a decrease, 9 reported no change, 5 reported somewhat of an increase in the number of discrepancies, and 10 failed to respond. The results of the questionnaire indicate that 15 of the 20 perceived equal or better performance under TSPR; however, 5 of the 20 respondents reported a degradation of performance.

Delinquent Deficiency Reports: The archival analysis indicates that performance under TSPR exceeds the standard each of the seven months. This performance was equal to the FY 98 pre-TSPR performance and significantly better than FY 97 performance. Of the 30 respondents to the questionnaire, 1 reported a greatly decreased number of delinquent deficiency reports, 3 reported somewhat of a decrease, 14 reported no change, 3 reported somewhat of an increase in the number of delinquent reports, and 9 failed to respond. The results of the questionnaire indicate that 18 of the 21 perceived equal or better performance under TSPR.

WST Availability: The archival analysis indicates that the WST availability under TSPR exceeds the standard each of the seven months. Availability under TSPR slightly exceeded the pre TSPR availability of FY97 and FY98; however, the FY97 and FY98 availability also exceeded the standard. We did not survey the group on this performance

metric because it was believed that they would not have insight into the availability of the trainer.

Overall Maintenance Relationship: This is not one of the measured performance indicators nor is archival data available to support this analysis; however, we believe the working relationship between the 49th Logistics Squadron and the place of depot repair is a significant indicator of perceived customer satisfaction. Of the 30 respondents to the questionnaire, 1 reported a greatly improved relationship, 10 reported the relationship was somewhat improved, 10 reported no change, 1 reported the relationship was somewhat worse, and 8 failed to respond. The results of the questionnaire indicate that 21 of the 22 respondents perceived an equal or better working relationship between the two organizations under TSPR.

The final question sought to determine if the correct performance indicators are being measured. The results of the questionnaire produced no significant responses. Only 5 respondents answered the question and none of them indicated any significant changes to the existing metrics. One did indicate that deployment initiatives should be considered while another said the metrics were good, but that the survey had come about 6 months too early. The respondent stated that "some indicators have not had enough time to be properly surveyed."

Table 5 summarizes the respondent's answers to the questionnaire. The following are the possible answers for each value question.

Questions:	6 & 8	7, 9, 10, 11	12
1	Much Better	Greatly Decreased	Greatly Improved
2	Somewhat Better	Somewhat Decreased	Somewhat Improved
3	No Change	Has Not Changed	Has Not Changed

4	Somewhat Worse	Somewhat Increased	Somewhat Worse
5	Much Worse	Greatly Increased	Much Worse

The following 5 responses were received on question 13:

- Respondent 13 stated "need to look at deployment initiatives – there are none."
- Respondent 19 stated "performance indicators are good, perhaps the survey is about 6-months early! Some indicators have not had enough time to be properly surveyed."
- Respondent 24 suggested we look at "repair times at the depot (how long it takes them to repair an asset). We should also watch depot repair costs," and stated "Overall, I am satisfied with the support I have received."
- Respondent 25 suggested we look at "Depot repair times, repair costs, and total turnaround time." They also stated "all in all I think we can make money with the TSPR system."
- Respondent 28 stated "haven't been here before Oct. 9. I don't really know what TSPR is or what it does for me. Good job in meeting surge requirements for example heat shields."

Table 5: Customer Satisfaction Questionnaire Responses

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Question**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
2	**Respondent**		**Quality Assurance**										
3	**1**	SSGT		0-1	HS	7-level	3	2	4	2,3,4	3	4	2,3
4	**2**	TSGT		9+	HS	7-level	3	3	3	1	3	3	3
5	**3**	MSGT		9+	HS	7-level	3	3	3	1	3	3	3
6	**4**	SSGT		9+	Assoc.	7-level	3	2	3	1	3	2	3
7	**5**	TSGT		8to9	HS	7-level	3	3	-	1	3	3	3
8	**6**	CMSGT		4to5	Assoc.	9-level	4	4	4	3	4	4	3
9			**Supply Squadron**										
10	**7**	TSGT		0-1	HS	7-level	3	3	2	3	3	3	3
11	**8**	TSGT		0-1	HS	7-level	-	-	-	-	-	-	-
12	**9**	MSGT		6 to 7	HS	7-level	2	4	2	3	3	3	2
13	**10**	TSGT		2 to 3	Assoc.	7-level	2	2	1	1	3	1	1
14	**11**	MSGT		-	-	7-level	2	3	3	-	-	-	-
15	**12**	TSGT		0-1	HS	7-level	2	3	3	2	3	4	2
16	**13**	MAJOR		0-1	MS	NA	2	2	3	-	-	-	2
17	**14**	CMSGT		2 to 3	Assoc.	NA	2	3	3	-	-	-	2
18			**49 OG**										
19	**15**	SMSGT		2 to 3	Assoc.	7-level	4	3	4	4	3	3	4
20	**16**	MSGT		0-1	Assoc.	7-level	2	4	3	4	3	3	2
21	**17**	CMSGT		4 to 5	BA	9-level	2	2	2	4	3	3	2
22	**18**	2LT		2 to 3	BA	3-level	2	2	3	4	3	2	2
23	**19**	MSGT		0-1	Assoc.	7-level	2	4	3	4	3	2	2
24	**20**	TSGT		0-1	HS	7-level	2	3	3	-	-	-	-
25			**MX Squadron**										
26	**21**	SMSGT		4 to 5	Assoc.	7-level	3	3	4	3	3	3	3
27	**22**	MSGT		6 to 7	HS	7-level	-	-	-	-	-	-	-
28	**23**	SMSGT		6 to 7	BA	9-level	-	-	-	-	-	-	-
29	**24**	TSGT		4 to 5	BA	7-level	3	3	2	3	3	3	2
30	**25**	MSGT		4 to 5	Assoc.	9-level	3	3	2	3	3	3	2
31	**26**	MSGT		4 to 5	Assoc.	7-level	3	4	3	3	3	3	3
32	**27**	COL		2 to 3	MS	NA	-	-	-	-	-	-	-
33	**28**	CAPT		0-1	MS	NA							
34	**29**	CMSGT		6 to 7	Assoc.	9-level	3	3	3	3	3	3	3
35	**30**	CMSGT		6 to 7	MS	9-level	1	3	2	3	3	3	3

Expert Interviews

Each interviewee was asked to provide their opinion on the three investigative questions. The three investigative questions are:

(1) Are the contract performance metrics good indicators of *better value*?

(2) Has the decision to outsource F-117 depot-level maintenance provided a *better value* to the Air Force?
(3) If outsourcing F-117 depot maintenance is an equal or better value, do we still want to give up the potential core capability?

The intent of these interviews is to obtain information on the intangible benefits or detriments to outsourcing the F-117 sustainment effort. Key senior individuals with knowledge of F-117 depot support were interviewed. A summary of their comments follows.

In general each of the interviewees stated that the metrics used to measure performance under the TSPR contract are proper measures of a better value, except they did not account for the intangibles like responsiveness. In most instances, the interviewees believed that responsiveness is significantly improved under the TSPR contract.

All of the interviewees indicated that outsourcing the F-117 sustainment effort has resulted in a better value to the Air Force.

On the question of core capability, all of the interviewees stated that the government has lost very little core capability due to the fact that the contractor has always performed the maintenance on this aircraft. However, they stated that we did lose some core capability in sustaining engineering and asset management. The consensus was that the loss of the core capability was small when compared to the projected $177.6 million financial savings over the life of the TSPR contract.

Triangulation

Data related to contractor performance was collected from three sources: archival, customer satisfaction questionnaires and expert interviews. Our analysis of the archival data establishes that performance under the TSPR contract has been equal to or better than performance prior to the award of the TSPR contract during FY97 and FY98, when measured by the performance indicators described elsewhere in this report. Our analysis of the customer satisfaction questionnaire results also indicates that the customer has found performance under TSPR to be equal to or better. And finally, the data gained through the expert interviews support the analysis of the archival data and the customer satisfaction questionnaire results. In conclusion, it appears that technical performance alone is not the controlling factor to determine if outsourcing sustainment tasks for the F-117 is a better value than organic support.

In the case of the F-117, cost savings appear to be the primary determinant of whether or not outsourcing is a better overall value to the Air Force. Current projections indicate savings of $25.2 million for FY99 alone. Savings for the life of the TSPR contract are estimated to be $177.6 million. This, coupled with the intangibles like improved responsiveness and improved working relationships identified during the expert interviews, appears to show that outsourcing the F-117 is a better value to the Air Force.

V. Summary and Conclusions

Chapter Overview

The Department of Defense must reduce its cost of support services if it is to meet national security goals as long as personnel and budgets continue to decline. Army Secretary Louis Caldera, Navy Secretary Richard Denzig and Acting Air force Secretary F. Whitten Peters, in a joint letter, said the BRAC process is "the only tool we have available to divest ourselves of unneeded infrastructure, consolidate missions and free funds to improve priority programs on the scale that we know is required" (Garamone, 1999: 13). In addition, the "24-star letter" signed by Chairman Army Gen. Henry Shelton, Vice Chairman Air Force Gen. Joseph Ralston, and service chiefs Army Gen. Dennis Reimer, Marine Corps Gen. Charles Krulak, Navy Adm. Jay Johnston and Air Force Gen. Michael Ryan noted that studies show that DoD has "23 percent excess capacity"(Garamone, 1999: 13). The letter goes on to say "BRAC is the single most effective tool for the services to realign their infrastructure to meet the needs of changing organizations and to respond to new ways of doing business. No other initiative can substitute for BRAC in terms of ability to reduce and reshape infrastructure. Simply stated, our military judgement is that further base closures are absolutely necessary" (Garamone, 1999: 13). In spite of these statements and recommendations by our military leaders, attempts at obtaining savings for modernization by closing bases and reducing unnecessary infrastructure have met with considerable resistance. This avenue of savings appears to be a questionable source. At least for the short term, outsourcing and privatization appear to be the methods of choice for reducing support costs.

Previous chapters have identified DoD's plans for outsourcing over the next five years. Organizations have reduced their future year's budget requests in anticipation of the projected savings resulting from these outsourcing projections. While statistics show that manning drops even when the government wins the competition, there is no proof that direct savings will result. Recent GAO reports indicate that the government activities involved in outsourcing have failed to accurately assess the true costs of outsourcing, and have likely overestimated projected savings. Our study has found that in the case of the F-117, there was little research to determine if the projected savings are real. The costs to downsize the government workforce were not considered because McClellan Air Force base, where the depot was located, was slated for closure.

This chapter reviews the results of our research with respect to the investigative questions first introduced in Chapter 1. First, it discusses whether the performance indicators being used to measure contractor performance are valid. Next, it examines if outsourcing the F-117 sustainment tasks have led to a better overall value to the Air force. Finally, if the answer to the second question is yes, it examines if the additional value to the Air Force justifies the loss of control of a core logistics function.

The purpose of this research was to examine the results of the decision to outsource the F-117 sustainment tasks. While there are many limiting factors to our research, such as the limited length of time since the effort was outsourced, the almost immediate deployment to Kosovo, and a lack of competition between the public and private sector, many conclusions can be inferred from the analysis.

The chapter ends with a summary of conclusions drawn from the research, recommendations on how this research might be employed to enhance future outsourcing decisions, and recommendations for future studies.

Review of Investigative Questions

Question 1

Are the contract performance metrics good indicators of better value?

The performance metrics selected to measure contractor performance under the TSPR contract are identical to those used by Air Combat Command (ACC) to measure performance of all aircraft under their control. The metrics used to measure performance are: mission capable rate, total non mission capable rate, MICAP delivery, RSP kit fill rate, depot delivery, depot quality, delinquent deficiency report rate, and weapon system trainer availability rate. We had two criteria for measuring the suitability of the selected performance measurements. The first criterion is whether the metrics can be used to compare performance before the TSPR contract with performance after TSPR. The second criterion is whether the customer perceives the metrics as adequate performance indicators.

We used historical performance data for the pre-TSPR FY97 and FY98 periods and actual contractor performance data accumulated since the beginning of the TSPR contract on 1 October 1998 for our comparison. We found the metrics adequate to use as a basis of comparison of performance before and after TSPR. Results from the customer satisfaction questionnaire were used to determine if the customers perceived the metrics as adequate indicators of performance. The results of our analysis of the questionnaire

data support the use of the existing performance indicators. In addition, the expert interviews also supported the use of the metrics, but suggested that intangibles like working relationship and responsiveness should be considered.

Question 2

Has the decision to outsource the responsibility for the F-117 depot-level maintenance provided a better value to the Air force?

The answer to this question forms the core of our research. We collected data from three sources to examine this question. Historical costs for F-117 sustainment were gathered from the F-117 System Program Office. This data was used as the baseline to compare what it cost to perform the effort before the TSPR contract was awarded to the cost of performance under the TSPR contract. Historical cost data for FY97 and FY98, along with the government's projection of "what it would have cost the government to continue the same level of support" during FY99 through FY06 was obtained. A comparison can be made between the government's projected costs from FY99 through FY06 to the actual contractor cost under TSPR. Historical technical performance data was collected for the FY97 and FY98 time periods. This data was compared to performance date generated under the TSPR contract to determine if the Air Force is obtaining a better value in terms of performance.

A second source of performance data was elicited from the customer satisfaction questionnaires. Responses to the questionnaire allowed us to examine the customer's perception of performance before TSPR to performance after TSPR. We can draw conclusions from the correlation of these two data points to examine if the Air Force is receiving a better value under TSPR from the customer's perspective.

Additionally, we solicited comments from senior level experts familiar with F-117 sustainment to obtain their assessment of performance before and after TSPR. To arrive at our conclusion we triangulated the data from the three sources: archival, customer satisfaction questionnaire, and expert interviews.

The projected savings for FY99, based on the contractor's estimate to complete, equate to $25.2 million. Looking solely at cost as the indicator, the TSPR contract is providing a better value to the government.

Our analysis indicates that there is little difference between the level of sustainment support prior to TSPR and the level of sustainment support after award of the TSPR contract. The final driver, in the case of the F-117, appears to be cost.

The customer satisfaction questionnaire indicates that the customers perceive sustainment support before and after award of the TSPR contract to be comparable.

Question 3

If outsourcing F-117 depot maintenance is an equal or better value, do we still want to give up the potential the core capability?

Our only source of insight into this question is the expert interviews. One limiting factor affecting our research is the short length of time since the TSPR contract was awarded. Although much has happened during that period, like the Kosovo deployment, seven months of performance is not sufficient time from which to draw conclusions.

On the question of core capability, all of the interviewees stated that the government has lost very little core capability due to the fact that the contractor has always performed the maintenance on this aircraft. However, they stated that we did lose

some core capability in sustaining engineering and asset management. The consensus was that the loss of the core capability was small when compared to the projected $177.6 million financial savings over the life of the TSPR contract.

Overall Conclusion

Although our findings are far from conclusive evidence that the Air Force as a whole is receiving a better value by outsourcing their depot level maintenance functions. It appears we are saving money on the F-117 under the TSPR contract. It is important to note that these savings are based on the available cost information and were not based on the governments most efficient organization analysis as required by A-76 regulations.

Recommendations for Further Use of This Information

With the elimination, or at least slow down, of base closures as the primary means of reducing costs within DoD, outsourcing has become the method of choice for cost reduction efforts. The results of this analysis, while only a single case study, indicate that DoD should be cautious about wholeheartedly embracing the Commission on Roles and Missions (CORM) and Defense Science Boards (DSB) recommendations to outsource essentially every non-warfighting activity. There is potential for savings; however, there are many factors to consider. DoD needs to be very careful about making outsourcing decisions before doing the research (Saleck, 1998). While each outsourcing decision is unique, there are key similarities. There are costs incurred in competitions between the public and private sector. There are costs associated with eliminating government civilian jobs. Many times the personnel savings are not as high as projected since many

displaced civilian employees *bump* into lower graded jobs while retaining their current pay, and often there is difficulty in comparing performance before and after. All of these problems can be overcome; however, these issues need to be considered before making the decision to outsource.

Recommendations for Future Research

A follow-on study should be accomplished to examine the decision to outsource F-117 sustainment efforts after the TSPR contract has been in place for at least two years. This should allow sufficient time for a fair comparison of performance before and after the TSPR contract was awarded.

A study should be accomplished that examines the overall benefit or detriment to the DoD from outsourcing. Once the decision to outsource a function has been made, the decision is nearly irreversible; infrastructure is eliminated and expertise is lost. Rather than look at a single circumstance, the overall picture needs to be examined to determine if, in total, outsourcing is detrimental to our ability to sustain a prolonged contingency.

The difficulty in making an accurate comparison lies in the ability of the government to accurately track its costs. It is imperative that we determine our true savings before projecting these savings into future budgets. A joint program team consisting of contracting, financial, budget, maintenance, and logistics personnel could focus on all aspects of outsourcing to determine true cost savings and the overall value to the Air Force. The goal would be to have each member provide input relating to their job specialty. Once key similarities are identified a model can be built that can be applied to any outsourcing situation with minimal tailoring for the specific situation.

Appendix A: Definitions

Key terms and definitions that are necessary to understand the major aspects of this research proposal include:

Outsourcing - is the use of federal funds to pay a private company to do defense work or provide a service for a defense activity (GAO Report, GAO/NSAID-97-86, 1997).

Privatization - is the complete transfer of ownership and management of a function to the private sector, but DOD pays for the services associated with the function (GAO Report, GAO/NSAID-97-86,1997).

Better Value – is a construct, in this framework, that is measured by whether or not there are actual improvements in cost, mission capable ratings (MCR's), quality, timeliness, and reliability of depot repairs. It also considers whether or not the knowledge, expertise and experience level of the contractor's depot-level technicians aids in the ability to answer questions and fix problems more rapidly and with greater accuracy than with the organic technicians. Finally it includes a measure of a perceived overall improved efficiency of the working relationship between flight line maintenance teams and the depot.

Modernization - is a key goal of the Air Force leadership, outlined in Joint Vision 2001, to replace or upgrade the aging Air Force weapon systems. This goal, due to decreasing budgets and manpower resources, is what drives the desire to save money by closing bases and outsourcing functions that are not inherently governmental.

Inherently Governmental Function - is "a function that is so intimately related to the public interest as to mandate performance by Government employees? These functions include those activities that require either the exercise of discretion in applying Government authority or the making of value judgments in making decisions for the Government" (GAO Report, GAO/NSAID-97-86, 1997).

The following definitions come directly from the F-117 TSPR Performance Metrics (as of 11 September 98).

Total Non Mission Capable Supply Rate – (TNMCS) is calculated monthly to establish a 12-month moving average. This metric is based upon the percentage of aircraft not mission capable due to supply. Non-Mission Capable Supply (NMCS) is additive to Non-Mission Capable Both (NCMB) to compute the TNMCS.
Scoring: NMCS rates at or below 5.0% will receive a score of 10. From 5.1% to 5.5% = 9, from 5.6% to 6.0% = 8 etc. All fractions will be rounded up to the nearest tenth. NMCS rates of 9.6% or greater it will receive a score of 0.
Premises:

1. This metric pertains to LMSW-supplied items only an excludes the following:

NSN items
Local Fabricated Items (SMR code MXX)
Local Assembled Items (SMR code AXX)
Local Purchased Items

Conditions:

1. HAFB will calculate the supply rate (S-Rate) monthly and provide to LMSW Support Center and SPO by the 15th of each month.

2. LMSW can request relief on specific items due to maintenance-induced failures of low stockage items (i.e. damaged noses, wages, etc.) The contracting officer will approve or deny requests for relief.

MICAP Delivery - MICAP response time will be calculated monthly to establish a twelve month moving average. This metric is based upon the time taken by LMSW to deliver parts on MICAPs to HAFB. A MICAP our will begin upon LMSW notification, requirement and will end upon receipt of the item in HAFB supply. Logs will be kept at LMSW and HAFB recording the time and date of the MICAP and the corresponding time/date of the part delivery. Scoring: Average response times of 72 hours or less will receive a score of 10. Average response times greater than 73 hours and up to 84 hours will receive a score of 9. Average response times between 85 and 96 hours will receive a score of 8, etc. Average response times greater than 181 will receive a score of 0.

Premises:

1. This metric pertains to LMSW supplied items only, which excludes the following:
   NSN items
   Local Fabricated Items (SMR code MXX)
   Local Assembled Items (SMR code AXX)
   Local Purchased Items

2. 72 hours applies to delivery within the Continental US (CONUS) only.

Conditions:

1. LMSW can request relief on specific items I created disproportionate negative impact on the right. The contracting officer will approve or deny any request for relief.

2. LMSW and HAFB logs will be reconciled and reported to LMSW Supply and SPO by the 15th of each month. HAFB will have the final decision on the report. Monthly report will be submitted to LMSW Supply and SPO.

RSP Kit Fill Rate - RSP Kit Fill Rates will be calculated monthly to establish a 12 month moving average. This metric is based upon the total number of pieces on hand in both A and B kits divided by the total number of pieces authorized. This rate is expressed as a percentage. Scoring: Fill rates at 97% or above will receive a score of 10.

From 96% to 96.9% = 9, 95% to 95.9% = 8 etc. All fractions will be rounded up to the nearest tenth. Fill rates below 86% will receive a score of 0.

Premises:

1. This metric pertains to LMSW-supplied Recoverable Items (XD) and excludes the following:
   NSN items
   Local Fabricated Items (SMR code MXX)
   Local Assembled Items (SMR code AXX)
   Local Purchased Items
   Deployed Kits

2. Kits returning from deployment shall be excluded from the metric performance measurement for 30 days to allow for stock replenishment.

Conditions:

1. HAFB will compile and submit a report to LMSW Supply and the SPO by the 15th of each month.

2. Mission Support Kit (MSK) requirements taken out of RSP still need to be reported as part of RSP. Deployment of one RSP Kit will not alter the metric criteria. Performance will continue to be graded against the remaining kit. Should all RSP Kits be deployed, the weight assigned to this metric will be assigned to NMCS for the duration of the deployment. When the kits return, the 12-month moving average will be reduced by the months the kits were deployed.
3. Should one or both kits deploy for less than a month, the kit will be considered deployed for the full month.

4. Top score of 97% applies to RSP Kits with Low Observable (LO) considerable materials. Should LO be removed from the kits, top score becomes 96%. The contract will not require renegotiation in this instance.

Depot Quality - is calculated by individual aircraft using a weighted point system that is based upon the number of major and minor discrepancies found after the contractor has requested DCMC sign-off for closure. After each inspection, representatives from LMSW Quality Assurance and DCMC Quality Assurance will review DCMC write-ups. Those found without merit will be documented but not considered for scoring. DCMC will have final determination of merit.

Scoring: Weighted Point System

Major Discrepancy Count	Points	Minor Discrepancy Count	Points
0-4	10	0-10	10
5-9	15	11-20	15
10-14	25	21-30	25
15-up	50	31-up	50

The number of major and minor discrepancies, found during DCMC Quality Assurance Inspections, on each aircraft are converted to points per aircraft. Points per aircraft will be totaled and divided by the number of aircraft inspected to produce a 12-month moving average. An average of 20 points results in a score of 10; 21 to 25 is a score of 9, etc. Totals of 65 points or higher results in 0 points.

Premises:

1. Major Discrepancy – (Red X as specified in TO 00-20-1): the weapon system, supports system, or equipment is considered unsafe or unfit for flight use. The weapon system, support system, or equipment will not be flown or used until the unsatisfactory condition is corrected or symbol cleared.

2. Minor Discrepancy – is an unsatisfactory condition, but the condition is not sufficiently urgent or dangerous to warrant grounding of the aircraft or discontinuing use of the equipment.

3. A list of Mandatory Government Inspections (MGIs) will be provided to LMSW Quality Assurance office. The MGI list may change due to the work contracted.

Conditions:

1. DCMC will provide a quarterly report to LMSW Quality Assurance and the SPO by the 15th of the month following the end of the quarter.

Depot Delivery - The depot delivery metric is calculated for each aircraft and is based upon the total number of days each aircraft fails to deliver on time. Delivery is tracked by aircraft and reflects the number of days behind schedule an aircraft is actually delivered. The number of days is totaled after each delivery and then averaged across the number of aircraft delivered to establish a 12-month moving average.

Scoring: Delivered aircraft will be scored as follows: An average of 0 to 0.9 days behind schedule receives a score of 10. An average of 1.0 to 1.9 days behind schedule receives a score of 8, 2.0 to 2.9 days behind schedule receives a score of 6, 3.0 to 3.9 days behind schedule receive a score of 4, 4.0 to 4.9 days behind schedule receives a score of 2, and aircraft 5 or more days behind schedule receive a score of 0.

Premises:

1. Total days behind schedule are calculated by adding the number of total days aircraft were not delivered on the scheduled output date.

2. "On time delivery" is defined as all depot requirements have been met and wheels are up and locked on departure from the depot.

Conditions:

1. Aircraft will be delivered in accordance with the negotiated work package. Changes in delivery will be negotiated between LMSW, DCMC and the SPO.

2. DCMC will provide a quarterly report to LMSW Quality Assurance and the SPO by the 15th of the month, following the end of the quarter.

Delinquent Efficiency Reports (DRs) - Delinquency tracking is performed monthly to establish a 12-month moving average. This metric is based on the average number of delinquent DRs. Scoring: An average of 0 to 1 delinquent DRs for the reporting period receives a score of 10. 2 delinquent DRs receive a score of 9, 3 delinquent DRs receive a score of 8, etc. 11 or more delinquent DRs receive a score of 0.

Premises:

1. DR response time starts upon receipt of exhibit at LMSW or Supplier Facility (if shipped direct).

2. Time frames for this metric are contained in TSPR 800, dated 1 Oct. 98.

Conditions:

1. LMSW will provide a quarterly report to the SPO by the 15th of the month, following the end of the quarter.

WST Credited Availability -WST Credited Availability is calculated monthly to establish a 12-month moving average. Credited availability is computed as follows:

$$Ca = \frac{Tu + Td - Tc + Ta}{Ts + Ta}$$

Ca = Credited Availability
Tu = Utilization Time (Actual WST usage for the period)
Td = Total Deviation Time (Events such as the weather, power outages, etc. that cannot be controlled by the contractor).
Tc = Chargeable Maintenance Deviations (Unscheduled maintenance performed during schedule training time).
Ta = Alternate Mission Time (Negative if time lost) (Time spent on a mission other than what was planned for training because of degraded WST performance).
Ts = Scheduled training time

WST Availability metrics by fiscal year (FY) shall be as follows:

FY	Metric
'99	99%
'00	99%
'01	*93%
'02	*91%
'03	*89%
'04	*75%
'05	**97%
'06	**99%

Scoring: An average of 99% or greater for the period receives a score of 10. From 98.6 to 98.9 receives a score of 9, etc. An average of 95% or last receives a score of 0. (In years were the top score differs from 99% (FY' 01-05), metric scoring will begin with the number shown in the table above and be broken down accordingly.)

Conditions:

1. LMSW will provide a quarterly report to the SPO by the 15 of the month, following the end of the quarter.

2. * - The AP500, Array Processor, will impact of the WST availability beginning in FY' 01. An interim solution must be implemented no later than FY01 or the Array Processor (AP500) will be significantly impacted to the point where it would become nonfunctional. If this occurs or when the remaining spares are no longer supportable the WST availability will be calculated on all functions not dependent on the array processor.

3. ** - Upgrade to the host computer suite will occur in FY' 04. WST availability will reduce each fiscal year based on supportability of the current host computer suite. Should upgrade of the host computer suite not occur in FY' 04, WST availability will be reduced to 50% in FY' 05 and 0% in FY' 06.

4. Upgrade to the host computer suite is considered outside the scope of the TSPR contract.

General Scoring/Performance Calculations:

"Total Value" consists of:

1. Current Performance
2. Score - Calculated based on Current Performance
3. Weight - Normalizes the metric to the weight of its importance
4. Value - Score x Weight

"Total Value" calculations are based as follows:

1. Performance values are translated into Scores based on comparison of Current Performance to the respective scoring guidelines found in the matrix.

2. Wants the actual Score is determined, it is entered as the Score at the top of the chart.
3. That Score is then multiplied by the Weight assigned to the respective metric and is reflected on the line identified as Value.
4. Each metric has been assigned a metric based on criticality of support to HAFB.
5. Maximum point value for "Total Value" is 1,000 distributed as follows:
    - CLIN 0001 700 Points
        - NMCS
        - MICAP
        - RSP Fill Rate
        - Delinquent DRs
        - WST Availability

    - CLIN 0002 300 Points
        - DCMC Depot Quality Assurance
        - Depot Delivery
6. Total points awarded will be displayed as a percentage of this Total Points Available. This percentage will be the Performance Incentive Fee for each CLIN.

    Example:
    Delinquent DRs: Current Performance = 0 Delinquent
    Score = 10
    Weight = 10
    Value toward Total = Score (10) x Weight (10) = Value (100 Points)

Appendix B: Customer Satisfaction Questionnaire

Demographics

1.) What is your current rank? _____

2.) What is your current duty title? _____

3.) How many years experience do you have working on the F –117?

0-1 2-3 4-5 6-7 8-9 9+

4.) What is the highest education level you have completed?

High school Associates Degree Bachelor's Degree Masters Degree Ph.D.

5.) What is your current career skill level?

3 level 5 level 7 level

Performance Questions

Effective 1 October 1998, a contract was let to transfer total system performance responsibility for depot level maintenance to a contractor. The following questions seek to measure your perceptions of the difference in the quality of support you receive, if any, comparing support for the periods before 1 Oct 98 to support after 1Oct 98.

6.) The number of aircraft non mission capable due to supply is .....

1	2	3	4	5
Much Better	Somewhat Better	No Change	Somewhat Worse	Much Worse

7.) The time it takes to have MICAP parts delivered has .....

1	2	3	4	5
Greatly Decreased	Marginally Decreased	Has Not Changed	Somewhat Increased	Greatly Increased

8.) Replacement Spare Parts (RSP) Kit fill rates are

1	2	3	4	5
Much Better	Somewhat Better	No Change	Somewhat Worse	Much Worse

9.) The number of major and minor discrepancies found after depot repair has .....

1	2	3	4	5
Greatly Decreased	Somewhat Decreased	Has Not Changed	Somewhat Increased	Greatly Increased

10.) The number of aircraft being delivered behind schedule from the depot has

1	2	3	4	5
Greatly Decreased	Somewhat Decreased	Has Not Changed	Somewhat Increased	Greatly Increased

11.) The number of Delinquent Efficiency Reports (DR's) has .....

1	2	3	4	5
Greatly Decreased	Somewhat Decreased	Has Not Changed	Somewhat Increased	Greatly Increased

12.) The overall maintenance relationship between the depot and the 49th is....

1	2	3	4	5
Greatly Improved	Somewhat Improved	Has Not Changed	Somewhat Worse	Much Worse

13.) Are we measuring the correct performance indicators? Please tell us what things you believe should be measured to evaluate the contractors performance in regards to helping you perform your job in the most effective and efficient manner possible.

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Vita

Lieutenant Harry T. Loughran was born on 19 November 1971 in Warren, Michigan. He graduated from Edison High School in Huntington Beach, California in May 1989. He entered military service at the age of 17 and was stationed at the 55th Contracting Squadron at Offutt Air Force Base in Omaha, Nebraska. Attending night school for two years, he completed an Associates Degree in Government Contract Management and was selected for early release from active duty to AFROTC Detachment 470 at the University of Nebraska at Omaha. While there he was recognized by the University for outstanding academic and leadership performance by his acceptance into the National Honor Society and Who's Who in American Colleges and Universities.

He was commissioned in December 1995 with a Bachelor's Degree in Business Administration and immediately assigned to Wright Labs Research and Development Contracting Branch where he served as the Flight Dynamics Contract Manager. In October of 1997 he was selected to be the lead contract manager for the F-22 Production Program Support Contract until May of 1998 when he entered the Graduate Contracting Management program, School of Logistics and Acquisition Management, Air Force Institute of Technology. Upon graduation, he will be assigned to the Space and Missile Systems Center at Los Angeles Air Force Base, California. He is married to the former Nancy Harmon of Maple Grove, MN and has one child, Ashley age 1.

Permanent Address: 1114 Beaumont Avenue
Dayton OH 45410

Vita

Mr. John S. Webb was born in August 1946 in Dayton, Ohio. He graduated from Fairview High School in Dayton in 1964. Mr. Webb began his federal career in September 1965 with the Defense Electronics Supply Center (DESC) as a supply clerk. His civilian career was interrupted while he served two years with the United States Army including one year in the Republic of Vietnam where he was awarded the Bronze Star with "V" device and the Purple Heart. After being released from the Army, he returned to DESC to resume his civilian career. Mr. Webb started his contracting career as a purchasing agent responsible for acquiring various electronic components. He transferred to Wright-Patterson AFB in 1976.

Mr. Webb has held many varied assignments. He spent nearly five years as Deputy for the Defense Contract Management Command in Riyadh Saudi Arabia. During this assignment, Mr. Webb was awarded the Meritorious Civilian Service Award for his actions immediately following the Khobar Tower bombing in Dhahran, Saudi Arabia. In his most recent position, he was assigned as a member of the contract review committee at Aeronautical Systems Center.

In June 1998, Mr. Webb entered the Graduate Contract Management program, School of Logistics and Acquisition Management, Air Force Institute of Technology. Upon graduation, he will return to the Aeronautical Systems Center at Wright-Patterson AFB. He is married to the former Sandra Zane of Deepwater, New Jersey and has four children, Tammy, John, George, and Sarah.

Permanent Address: 7895 Crestway Drive
Clayton OH 45315

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Harry T. Loughran, First Lieutenant, USAF
Mr. John Webb

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Air Force Institute of Technology
2570 P Street
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Col. Barry Wilson
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1060 Air Force Pentagon
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13. ABSTRACT *(Maximum 200 words)*

The purpose of this research was to determine whether or not outsourcing of the depot-level maintenance of the F-117 was a better value than maintaining the capability in house. Specifically, this thesis sought to answer three questions:
1.) Are the contract performance metrics good indicators of "better value"
2.) Has the decision to outsource F-117 depot-level maintenance provided a better value to the Air Force?
3.) If outsourcing F-117 depot maintenance is an equal or better value, do we still want to give up the potential core capability?
The research questions were answered through an extensive literature review, triangulation of archival data, customer satisfaction questionnaire, and expert interviews. The research indicates that the Air Force should be cautious about making the decision to outsource before doing an analysis of projected benefits.

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